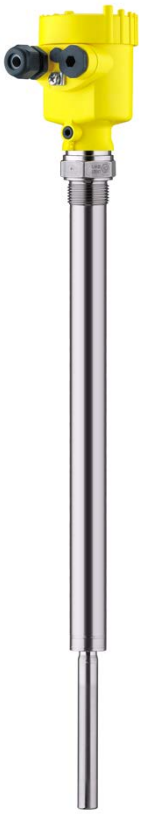
Operating Instructions

Vibrating level switch with tube extension for granuled bulk solids



VEGAVIB 63

- NAMUR

Document ID: 31217

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Supplementary documentation

Information:
Supplementary documents appropriate to the ordered version come with the delivery. You can find them listed in chapter "*Product description*".

Instructions manuals for accessories and replacement parts

Tip:
To ensure reliable setup and operation of your VEGAVIB 63, we offer accessories and replacement parts. The corresponding documentations are:

- 31086 - External housing - VEGAVIB
- 30172 - Electronics module VEGAVIB series 60
- 34296 - Protective cover
- 29753 - Lock fitting for VEGAVIB 63 unpressurized
- 29754 - Lock fitting for VEGAVIB 63 16 bar

Editing status:2014-05-26

31217-EN-140625

1 About this document

1.1 Function

This operating instructions manual provides all the information you need for mounting, connection and setup as well as important instructions for maintenance and fault rectification. Please read this information before putting the instrument into operation and keep this manual accessible in the immediate vicinity of the device.

1.2 Target group

This operating instructions manual is directed to trained specialist personnel. The contents of this manual should be made available to these personnel and put into practice by them.

1.3 Symbols used

Information, tip, note
This symbol indicates helpful additional information.

Caution: If this warning is ignored, faults or malfunctions can result.

Warning: If this warning is ignored, injury to persons and/or serious damage to the instrument can result.

Danger: If this warning is ignored, serious injury to persons and/or destruction of the instrument can result.

Ex applications
This symbol indicates special instructions for Ex applications.

SIL applications
This symbol indicates instructions for functional safety which must be particularly taken into account for safety-relevant applications.

- **List**
  The dot set in front indicates a list with no implied sequence.

→ **Action**
This arrow indicates a single action.

1 **Sequence of actions**
Numbers set in front indicate successive steps in a procedure.

Battery disposal
This symbol indicates special information about the disposal of batteries and accumulators.

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2 For your safety

2.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

During work on and with the device the required personal protective equipment must always be worn.

2.2 Appropriate use

The VEGAVIB 63 is a sensor for point level detection.

You can find detailed information about the area of application in chapter "*Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden.

2.3 Warning about incorrect use

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel overfill or damage to system components through incorrect mounting or adjustment.

2.4 General safety instructions

This is a state-of-the-art instrument complying with all prevailing regulations and guidelines. The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for the trouble-free operation of the instrument.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.

The safety instructions in this operating instructions manual, the national installation standards as well as the valid safety regulations and accident prevention rules must be observed by the user.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden.

The safety approval markings and safety tips on the device must also be observed.

2.5 Safety label on the instrument

The safety approval markings and safety tips on the device must be observed.

2.6 CE conformity

This device fulfills the legal requirements of the applicable EC guidelines. By attaching the CE mark, VEGA provides a confirmation of successful testing. You can find the CE conformity declaration in the download area of "www.vega.com".

2.7 SIL conformity

VEGAVIB 63 meets the requirements of functional safety according to IEC 61508. Further information is available in the Safety Manual "*VEGAVIB series 60*".

2.8 Safety instructions for Ex areas

Please note the Ex-specific safety information for installation and operation in Ex areas. These safety instructions are part of the operating instructions manual and come with the Ex-approved instruments.

2.9 Environmental instructions

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Please help us fulfill this obligation by observing the environmental instructions in this manual:

- Chapter "*Packaging, transport and storage*"
- Chapter "*Disposal*"

3 Product description

3.1 Configuration

Scope of delivery

The scope of delivery encompasses:

- VEGAVIB 63 point level switch
- Documentation
  - this operating instructions manual
  - Safety Manual "*Functional safety (SIL)*" (optional)
  - Supplementary instructions manual "*Plug connector for level sensors*" (optional)
  - Ex-specific "*Safety instructions*" (with Ex versions)
  - if necessary, further certificates

Constituent parts

The VEGAVIB 63 consists of the components:

- Housing cover
- Housing with electronics
- Process fitting with vibrating rod

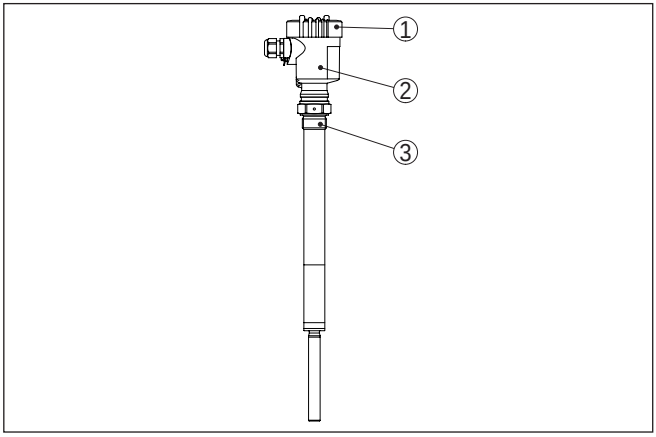

Fig. 1: VEGAVIB 63 - with plastic housing

1 Housing cover
2 Housing with electronics
3 Process fitting

Type label

The type label contains the most important data for identification and use of the instrument:

- Article number
- Serial number
- Technical data
- Article numbers, documentation
- SIL identification (with SIL rating ex works)

With the serial number, you can access the delivery data of the instrument via www.vega.com, "*VEGA Tools*" and "*serial number search*".

In addition to the type label outside, you can also find the serial number on the inside of the instrument.

3.2 Principle of operation

Application area

VEGAVIB 63 is a point level sensor with vibrating rod for level detection.

It is designed for industrial use in all areas of process technology and is preferably used for bulk solids.

Typical applications are overfill and dry run protection. Thanks to its simple and robust measuring system, VEGAVIB 63 is virtually unaffected by the chemical and physical properties of the bulk solid.

It also works when subjected to strong external vibrations or changing products.

Solid detection in water
If VEGAVIB 63 was ordered for solid detection in water, the vibrating rod is calibrated to the density of water. If covered by water (density: 1 g/cm³/0.036 lbs/in) VEGAVIB 63 signals "uncovered". Only if the vibrating element is also covered with solids (e.g. sand, sludge, gravel etc.) will the sensor signal "covered".

Function monitoring
The electronics module of VEGAVIB 63 monitors continuously the following criteria:

- Correct vibrating frequency
- Line break to the piezo drive

If one of these faults is detected, the electronics signals this via a defined current to the signal conditioning instrument. The connection cable to the vibrating element is also monitored.

Functional principle

The vibrating rod is piezoelectrically energised and vibrates at its mechanical resonance frequency of approx. 360 Hz. When the vibrating rod is submerged in the product, the vibration amplitude changes. This change is detected by the integrated electronics module and converted into a switching command.

Voltage supply

VEGAVIB 63 with NAMUR electronics can be connected to different NAMUR amplifiers depending on your requirements. The specifications for NAMUR amplifiers are available in the "*Technical data*".

The data for power supply are specified in chapter "*Technical data*".

3.3 Operation

With the factory setting, products with a density of > 0.05 g/cm³ (0.002 lbs/in³) can be measured. It is possible to adapt the instrument for products with lower density > 0.02 g/cm³ (0.0007 lbs/in³).

On the electronics module you will find the following display and adjustment elements:

- Signal lamp for indication of the switching status (yellow)
- Potentiometer for adaptation to the product density

- Mode switch to select the switching condition (reverse characteristics)
- Simulation key

3.4 Storage and transport

Packaging

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test based on ISO 4180.

The packaging of standard instruments consists of environment-friendly, recyclable carton material. The sensing element is additionally protected with a cardboard cover. For special versions, PE foam or PE foil is also used. Please dispose of the packaging material through specialised recycling companies.

Transport

Transport must be carried out in due consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the device.

Transport inspection

The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.

Storage

Up to the time of installation, the packages must be left closed and stored according to the orientation and storage markings on the outside.

Unless otherwise indicated, the packages must be stored only under the following conditions:

- Not in the open
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration

Storage and transport temperature

- Storage and transport temperature see chapter "*Supplement - Technical data - Ambient conditions*"
- Relative humidity 20 … 85 %

4 Mounting

4.1 General instructions

Suitability for the process conditions

Make sure that all parts of the instrument coming in direct contact with the process, especially the sensor element, process seal and process fitting, are suitable for the existing process conditions, such as process pressure, process temperature as well as the chemical properties of the medium.

You can find the specifications in chapter "*Technical data*" and on the nameplate.

Switching point

In general, VEGAVIB 63 can be installed in any position. The instrument only has to be mounted in such a way that the vibrating element is at the height of the desired switching point.

Moisture

Use the recommended cables (see chapter "*Connecting to power supply*") and tighten the cable gland.

You can give your instrument additional protection against moisture penetration by leading the connection cable downward in front of the cable entry. Rain and condensation water can thus drain off. This applies mainly to outdoor mounting as well as installation in areas where high humidity is expected (e.g. through cleaning processes) or on cooled or heated vessels.

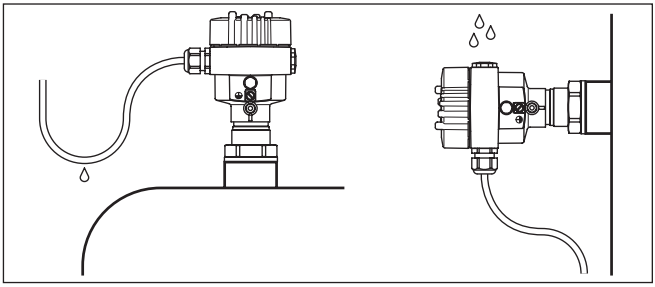

Fig. 2: Measures against moisture penetration

Transport

Do not hold VEGAVIB 63 on the vibrating element. Especially with flange and tube versions, the sensor can be damaged by the weight of the instrument.

Remove the protective cover just before mounting.

Pressure/Vacuum

The process fitting must be sealed if there is gauge or low pressure in the vessel. Before use, check if the seal material is resistant against the measured product and the process temperature.

The max. permissible pressure is specified in chapter "*Technical data*" or on the type label of the sensor.

Handling

The vibrating level switch is a measuring instrument and must be treated accordingly. Bending the vibrating element will destroy the instrument.

Warning:
The housing must not be used to screw the instrument in! Applying tightening force can damage internal parts of the housing.

Use the hexagon above the thread for screwing in.

4.2 Mounting instructions

Agitators and fluidization

Due to the effects of agitators, equipment vibration or similar, the level switch can be subjected to strong lateral forces. For this reason, do not use an overly long extension tube for VEGAVIB 63, but check if you can mount a short level switch on the side of the vessel in horizontal position.

Extreme vibration caused by the process or the equipment, e.g. agitators or turbulence in the vessel, e.g. by fluidisation, can cause the extension tube of VEGAVIB 63 to vibrate in resonance. This leads to increased stress on the upper weld joint. Should a longer tube version be necessary, you can provide a suitable support directly above the vibrating element to secure the extension tube.

This measure applies mainly to applications in Ex areas. Make sure that the tube is not subject to bending stress due to this measure.

Inflowing medium

If VEGAVIB 63 is mounted in the filling stream, unwanted false measurement signals can be generated. For this reason, mount VEGAVIB 63 at a position in the vessel where no disturbances, e.g. from filling openings, agitators, etc., can occur.

This applies particularly to instrument types with long extension tube.

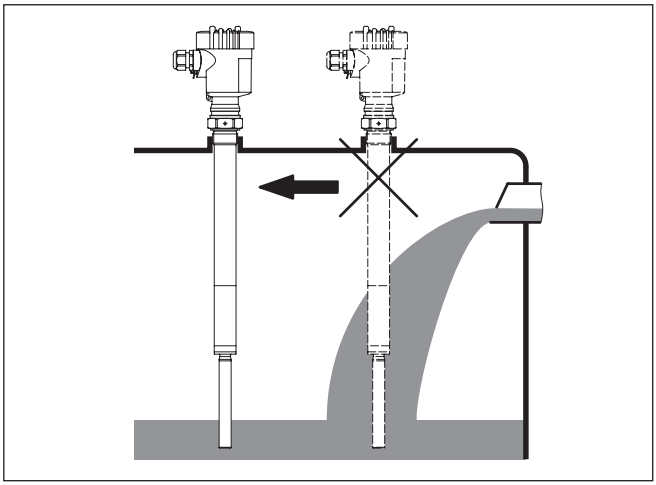

Fig. 3: Inflowing medium

Lock fitting

VEGAVIB 63 can be mounted with a lock fitting for height adjustment. Take note of the pressure information of the lock fitting.

Socket

The vibrating element should protrude into the vessel to avoid buildup. For that reason, avoid using mounting bosses for flanges and screwed fittings. This applies particularly to use with adhesive products.

Material cone

In silos for bulk solids, material cones can form and change the switching point. Please keep this in mind when installing the sensor in the vessel. We recommend selecting an installation location where the vibrating rod detects an average value of the material cone.

The vibrating rod must be mounted in a way that takes the arrangement of the filling and emptying apertures into account.

To compensate measurement errors caused by the material cone in cylindrical vessels, the sensor must be mounted at a distance of d/6 from the vessel wall.

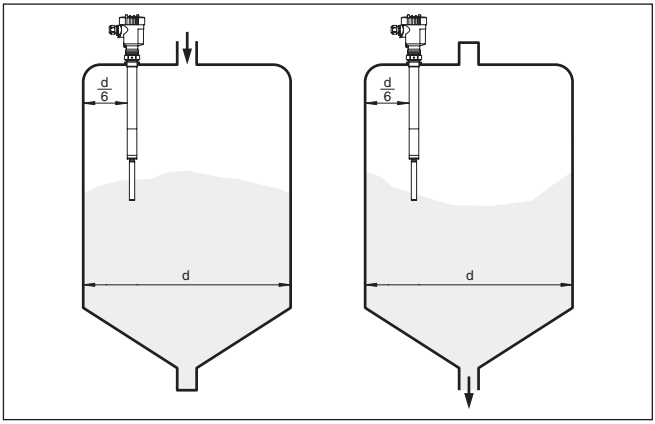

Fig. 4: Filling and emptying centred

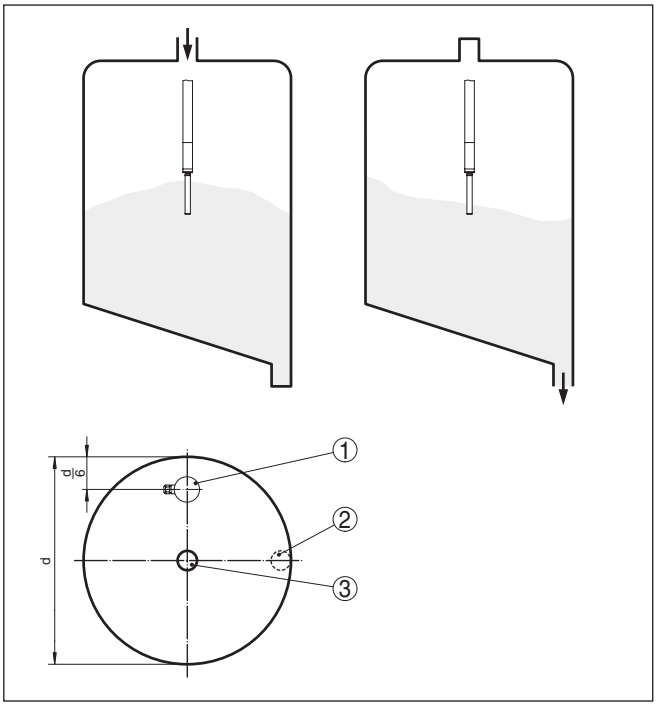

Fig. 5: Filling in the centre, emptying laterally

1 VEGAVIB 63
2 Discharge opening
3 Filling opening

Baffle protection against falling rocks

In applications such as grit chambers or settling basins for coarse sediments, the vibrating element must be protected against damage with a suitable baffle.

This baffle must be manufactured by you.

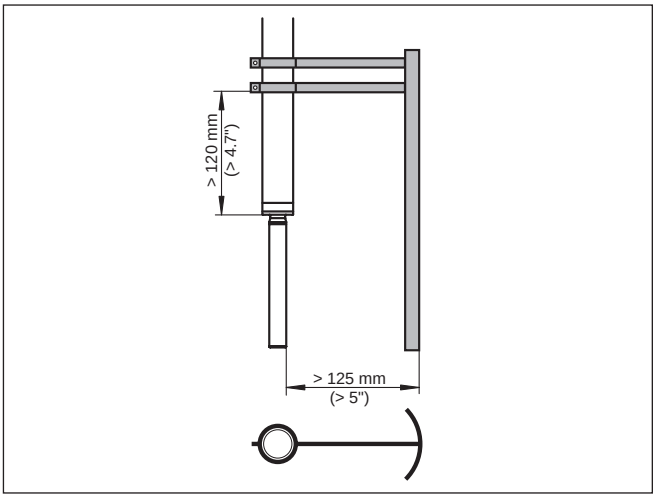

Fig. 6: Baffle for protection against mechanical damage

5 Connecting to power supply

5.1 Preparing the connection

Note safety instructions

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage

Take note of safety instructions for Ex applications

In hazardous areas you must take note of the respective regulations, conformity and type approval certificates of the sensors and power supply units.

Voltage supply

Connect the operating voltage according to the following diagrams. Take note of the general installation regulations. As a rule, connect VEGAVIB 63 to vessel ground (PA), or in case of plastic vessels, to the next ground potential. On the side of the instrument housing there is a ground terminal between the cable entries. This connection serves to drain off electrostatic charges. In Ex applications, the installation regulations for hazardous areas must be given priority.

The data for power supply are specified in chapter "*Technical data*".

Connection cable

The instrument is connected with standard two-wire cable without screen. If electromagnetic interference is expected which is above the test values of EN 61326 for industrial areas, screened cable should be used.

Use cable with round cross-section. A cable outer diameter of 5 … 9 mm (0.2 … 0.35 in) ensures the seal effect of the cable gland. If you are using cable with a different diameter or cross-section, exchange the seal or use a suitable cable gland.

In hazardous areas, only use approved cable connections for VEGAVIB 63.

Connection cable for Ex applications

Take note of the corresponding installation regulations for Ex applications.

Cover all housing openings conforming to standard according to EN 60079-1.

5.2 Connection procedure

With Ex instruments, the housing cover may only be opened if there is no explosive atmosphere present.

Proceed as follows:

1. Unscrew the housing cover
2. Loosen compression nut of the cable entry gland
3. Remove approx. 10 cm (4 in) of the cable mantle, strip approx. 1 cm (0.4 in) of insulation from the ends of the individual wires
4. Insert the cable into the sensor through the cable entry
5. Lift the opening levers of the terminals with a screwdriver (see following illustration)

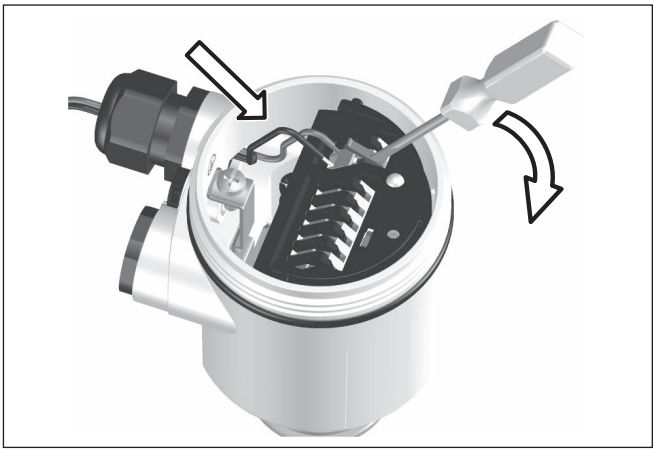

Fig. 7: Connection steps 5 and 6

6. Insert the wire ends into the open terminals according to the wiring plan
7. Press down the opening levers of the terminals, you will hear the terminal spring closing
8. Check the hold of the wires in the terminals by lightly pulling on them
9. Tighten the compression nut of the cable entry gland. The seal ring must completely encircle the cable
10. If necessary, carry out a fresh adjustment
11. Screw the housing cover back on

The electrical connection is finished.

5.3 Wiring plan, single chamber housing

The following illustrations apply to the non-Ex as well as to the Ex-d version.

Housing overview

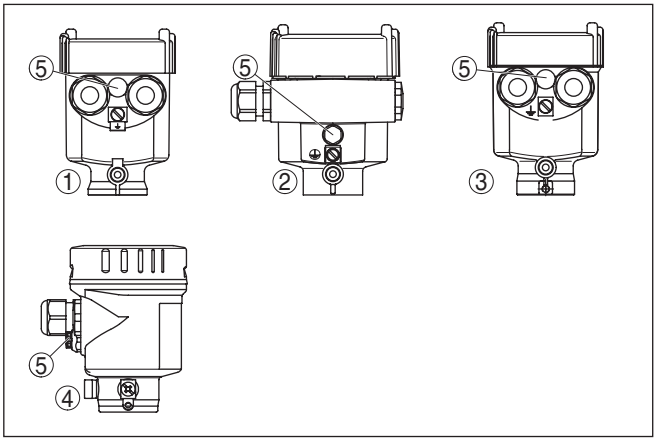

Fig. 8: Material versions, single chamber housing

1 *Plastic (not with EEx d)*
2 *Aluminium*
3 *Stainless steel (not with EEx d)*
4 *Stainless steel, electropolished (not with EEx d)*
5 *Filter element for pressure compensation or blind plug with version IP 66/ IP 68, 1 bar (not with EEx d)*

Wiring plan

For connection of the amplifier according to NAMUR (IEC 60947-5-6, EN 50227). You can find further information in the "*Technical data*".

Further information you will find in the "*Technical data*", "*Ex technical data*" are specified in the attached "*Safety instructions manual*".

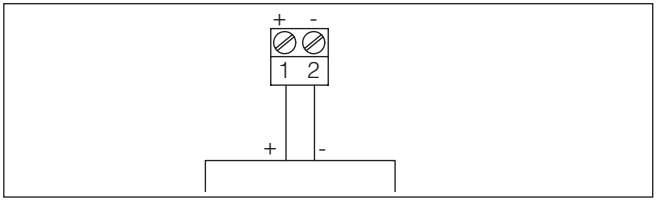

Fig. 9: Wiring plan, single chamber housing

External simulation key

In addition to the test key on the electronics module, you can connect an external key to start the test procedure. Connect the key according to the following wiring plan. In shipping condition, terminals 3 and 4 are bridged.

For additional information see "*Recurring function test*".

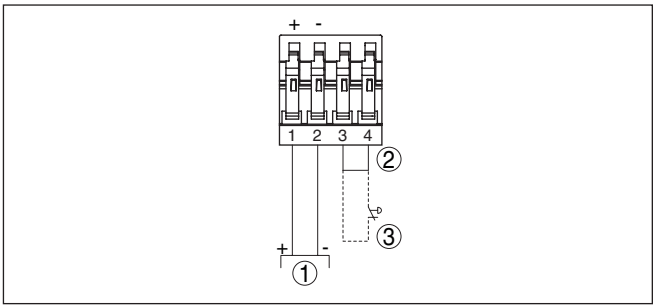

Fig. 10: Wiring plan - External simulation key

1 NAMUR amplifier
2 Bridge
3 External simulation key

5.4 Wiring plan - version IP 66/IP 68, 1 bar

Wire assignment, connection cable

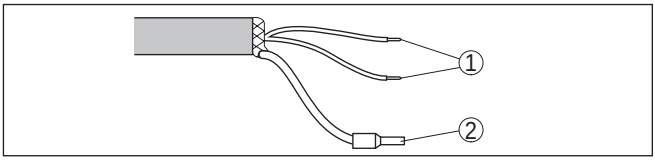

Fig. 11: Wire assignment, connection cable

1 brown (+) and blue (-) to power supply or to the processing system
2 Shielding

6 Setup

6.1 General information

The figures in brackets refer to the following illustrations.

Function/Configuration

On the electronics module you will find the following display and adjustment elements:

- Potentiometer for adaptation to the product density (1)
- DIL switch for mode adjustment - min./max. (2)
- Simulation key (3)
- Signal lamp (6)

6.2 Adjustment elements

Electronics and terminal compartment

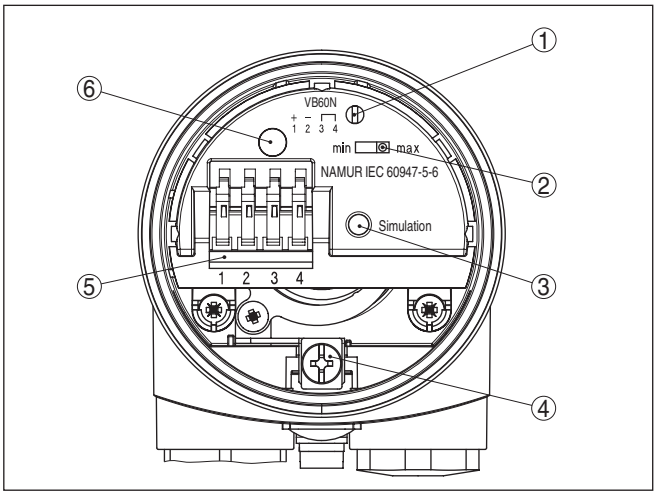

Fig. 12: Electronics and connection compartment - NAMUR output

1 Potentiometer for switching point adaptation
2 DIL switch for characteristics reversal
3 Simulation key
4 Ground terminal
5 Connection terminals
6 Control lamp

Switching point adaptation (1)

With the potentiometer you can adapt the switching point to the solid. It is already preset and must only be modified in special cases.

As a default setting, the potentiometer of VEGAVIB 63 is set to the complete right position (> 0.3 g/cm³/0.011 lbs/in³). In very light solids you have to turn the potentiometer to the complete left position (0.02 … 0.1 g/cm³ or 0.0007 … 0.0036 lbs/in³). By doing this, VEGAVIB 63 will be more sensitive and light solids can be detected more reliably.

For instruments detecting solids in water, these settings are not applicable. The switching point adaptation is preset and must not be changed.

Characteristics reversal (2)

The characteristics reversal can be carried out with the DIL switch. You can choose between falling characteristic curve (switch position max.) and rising characteristic curve (switch position min.). This allows you to output the desired current.

Modes

- min. - rising characteristic curve (High current when immersed)
- max. - falling characteristics (Low current when immersed)

The NAMUR output can be switched over to falling or rising characteristics (see also "*Function chart*").

Simulation key (3)

The simulation key is located in a recess on the upper side of the electronics module. Push the simulation key with a suitable object (screwdriver, pen, etc.).

When the key is pushed, a line break between sensor and processing unit is simulated. The signal lamp on the sensor extinguishes. The measuring system must signal a fault and take on a safe state when the key is pushed.

Keep in mind that downstream connected instruments will be activated during operation. This allows you to check the correct function of the measuring system.

Signal lamp (6)

Control lamp (LED) for indication of the switching condition

- yellow = High current ≥ 2.4 mA
- dark = Low current ≤ 1 mA
- yellow (flashing) = Failure ≤ 1 mA

6.3 Function chart

Level switch VEGAVIB 63
The following chart provides an overview of the switching conditions depending on the set mode and the level.

Note:
The mode setting on the NAMUR amplifier must be selected in such a way that the switching output takes on safe state in case of failure (I ≤ 1 mA).

	Level	Signal current - Sensor	Control lamp
Falling characteristics max.		≥ 2.4 mA	

	Level	Signal current - Sensor	Control lamp
Falling characteristics max.		≤ 1 mA	○
Rising characteristics min.		≥ 2.4 mA	☼
Rising characteristics min.		≤ 1 mA	○
Fault	any	≤ 1 mA	☼ flashes

6.4 Recurring function test

According to IEC 61508.

VEGAVIB 63 is qualified in mode A (overfill protection) for use in measuring chains of stage SIL2 according to IEC 61508 (redundant, stage SIL3).

SIL

The following instrument combinations meet the requirements according to SIL:

VEGAVIB 63

- Oscillator VB60N

Recurring function test

The recurring test according to IEC 61508 can be carried out by pushing the simulation key on the electronics module or by briefly (> 2 seconds) interrupting the cable to the sensor. The correct sequence of the switching conditions must be monitored via the switching amplifier as well as the connected systems. The sensor must neither be removed nor response must be triggered by filling the vessel. This applies to VEGAVIB 63 with NAMUR electronics module VB60N.

You can carry out the function test with the outputted current values also directly via a safety PLC or a process control system.

Simulation key on the electronics module

A function test can be carried out for measurement setups in conjunction with the NAMUR electronics module VB60N. For this purpose, the switching delay must be set to 0.5 s. VEGAVIB 63 has an integrated simulation key. The simulation key is lowered on the electronics module. Push the simulation key for > 2 seconds.

If VEGAVIB 63 is connected to an SPLC, you have to interrupt the connection cable to the sensor for > 2 seconds.

After releasing the simulation key or briefly interrupting the connection cable to the sensor, you can check the complete measuring system on correct function. A switching procedure is simulated during the test.

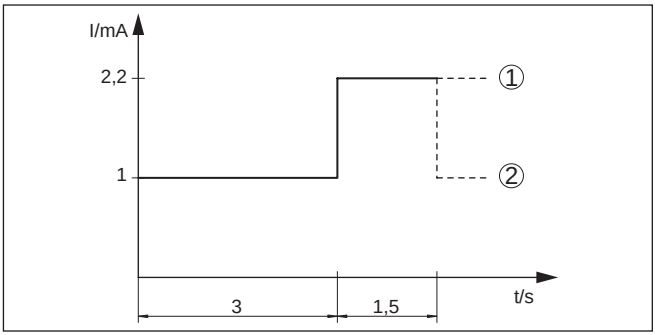

Fig. 22: Flow chart of the function test

1 Full signal
2 Empty signal

Check if all the switching conditions occur in the correct sequence and the stated time period. If this is not the case, there is a fault in the measuring system. Keep in mind that connected instruments are activated during the function test. This allows you to check the correct function of the measuring system.

Note:
Keep in mind that the starting time t_A of the voltage supply can extend the time up to the first switching.

Test procedure

After releasing the button or after a brief line break.

The specified times apply with a tolerance of ±20 %.

	Sensor current	Level relay amplifier - overflow protection	Level relay amplifier - dry run protection	Signal lamp amplifier - overflow protection	Signal lamp amplifier - dry run protection	Signal lamp - sensor
1. Low Current (approx. 3 s)	approx. 1 mA	energized	currentless	☼	○	○
2. High Current (approx. 1.5 s)	approx. 2.2 mA	currentless	energized	○	☼	☼
3. Return to the actual operating condition						

Note:
When used in measuring chains according to IEC 61508, mode B (dry run protection) is not permitted.

You can carry out the function test with the stated current values also directly with a safety PLC or a process control system.

Test assessment (SPLC)

Test passed

- Low Current ≥ 2 s
- High Current ≥ 1 s

Test not passed

- Low Current < 2 s / > 4 s
- High Current < 1 s / > 2 s

7 Maintenance and fault rectification

7.1 Maintenance

If the instrument is used properly, no special maintenance is required in normal operation.

7.2 Rectify faults

Reaction when malfunctions occur

The operator of the system is responsible for taking suitable measures to rectify faults.

Failure reasons

VEGAVIB 63 offers maximum reliability. Nevertheless, faults can occur during operation. These may be caused by the following, e.g.:

- Sensor
- Process
- Voltage supply
- Signal processing

Fault rectification

The first measure to be taken is to check the output signal. In many cases, the causes can be determined this way and the faults rectified.

24 hour service hotline

Should these measures not be successful, please call in urgent cases the VEGA service hotline under the phone no. **+49 1805 858550**.

The hotline is manned 7 days a week round-the-clock. Since we offer this service worldwide, the support is only available in the English language. The service is free, only standard call charges are incurred.

Checking the switching signal

Error	Cause	Rectification
VEGAVIB 63 signals "covered" without being submerged (overfill protection) VEGAVIB 63 signals "uncovered" when being submerged (dry run protection)	Operating voltage too low	Check operating voltage
	Electronics defective	Press the characteristic reversal switch. If the instrument then changes the mode, the vibrating element may be covered with buildup or mechanically damaged. Should the switching function in the correct mode still be faulty, return the instrument for repair.
		Push the characteristic reversal switch. If the instrument then does not change the mode, the electronics module may be defective. Exchange the electronics module.
	Unfavourable installation location	Mount the instrument at a location in the vessel where no dead zones or air bubbles can form.
	Buildup on the vibrating element	Check the vibrating element and the sensor if there is buildup and remove it.
	Wrong characteristic selected	Set the correct characteristics on the characteristics reversal switch (overflow protection, dry run protection). Wiring should be carried out according to the idle current principle.

Error	Cause	Rectification
Signal lamp flashes yellow	Error on the vibrating element	Check if the vibrating element is damaged or extremely corroded.
	Interference on the electronics module	Exchanging the electronics module
	instrument defective	Exchange the instrument or send it in for repair

Reaction after fault rectification

Depending on the reason for the fault and the measures taken, the steps described in chapter "*Set up*" may have to be carried out again.

7.3 Exchanging the electronics module

In general, all electronics modules of series VB60 can be interchanged. If you want to use an electronics module with a different signal output, you can download the corresponding operating instructions manual from our homepage under Downloads.

With Ex-d instruments, the housing cover may only be opened if there is no explosive atmosphere present.

Proceed as follows:

1. Switch off power supply
2. Unscrew the housing cover
3. Lift the opening levers of the terminals with a screwdriver
4. Pull the connection cables out of the terminals
5. Loosen the two screws with a screw driver (Torx size T10 or slot 4)

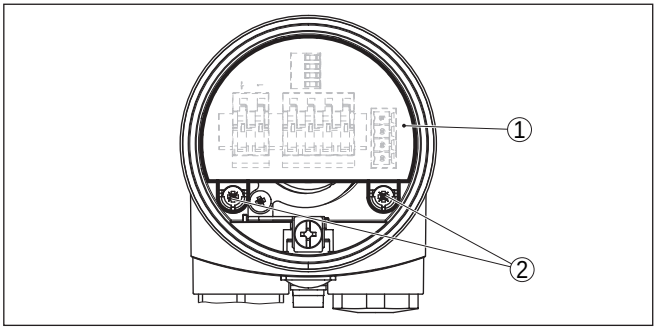

Fig. 29: Loosening the holding screws

1 Electronics module
2 Screws (2 pcs.)

6. Pull out the old electronics module
7. Compare the new electronics module with the old one. The type label of the electronics module must correspond to that of the old electronics module. This applies particularly to instruments used in hazardous areas.

8. Compare the settings of the two electronics modules. Set the adjustment elements of the new electronics module to the same setting of the old one.

Information:
Make sure that the housing is not rotated during the electronics exchange. Otherwise the plug may be in a different position later.

9. Insert the electronics module carefully. Make sure that the plug is in the correct position.
10. Screw in and tighten the two holding screws with a screwdriver (Torx size T10 or Phillips 4)
11. Insert the wire ends into the open terminals according to the wiring plan
12. Press down the opening levers of the terminals, you will hear the terminal spring closing
13. Check the hold of the wires in the terminals by lightly pulling on them
14. Check cable gland on tightness. The seal ring must completely encircle the cable.
15. Screw the housing cover back on

The electronics exchange is now finished.

7.4 How to proceed if a repair is needed

You can find a repair form as well as detailed information on how to proceed at www.vega.com/downloads and "*Forms and certificates*".

By doing this you help us carry out the repair quickly and without having to call back for needed information.

If a repair is necessary, please proceed as follows:

- Print and fill out one form per instrument
- Clean the instrument and pack it damage-proof
- Attach the completed form and, if need be, also a safety data sheet outside on the packaging
- Please contact the agency serving you to get the address for the return shipment. You can find the agency on our home page www.vega.com.

8 Dismount

8.1 Dismounting steps

Warning:
Before dismounting, be aware of dangerous process conditions such as e.g. pressure in the vessel, high temperatures, corrosive or toxic products etc.

Take note of chapters "*Mounting*" and "*Connecting to power supply*" and carry out the listed steps in reverse order.

With Ex instruments, the housing cover may only be opened if there is no explosive atmosphere present.

8.2 Disposal

The instrument consists of materials which can be recycled by specialised recycling companies. We use recyclable materials and have designed the parts to be easily separable.

WEEE directive 2002/96/EG
This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws. Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points. These may be used only for privately used products according to the WEEE directive.

Correct disposal avoids negative effects on humans and the environment and ensures recycling of useful raw materials.

Materials: see chapter "*Technical data*"

If you have no way to dispose of the old instrument properly, please contact us concerning return and disposal.

9 Supplement

9.1 Technical data

General data	
Material 316L corresponds to 1.4404 or 1.4435	
Materials, wetted parts	
– Process fitting - thread	316L
– Process fitting - flange	316L
– Process seal	Klingersil C-4400
– Vibrating rod	316L, 318 S13 (1.4462)
– Extension tube ø 29 mm (1.14 in)	316L
Materials, non-wetted parts	
– Plastic housing	plastic PBT (Polyester)
– Aluminium die-casting housing	Aluminium die-casting AlSi10Mg, powder-coated - basis: Polyester
– Stainless steel housing - precision casting	316L
– Stainless steel housing, electropolished	316L
– Seal between housing and housing cover	NBR (stainless steel housing, precision casting), silicone (aluminium/plastic housing; stainless steel housing, electropolished)
– Light guide in housing cover (plastic)	PMMA (Makrolon)
– Ground terminal	316L
Process fittings	
– Pipe thread, cylindrical (DIN 3852-A)	G1 A, G1½ A
– American pipe thread, conical (ASME B1.20.1)	1 NPT, 1½ NPT
Weight approx.	
– Instrument weight (depending on process fitting)	0.8 … 4 kg (0.18 … 8.82 lbs)
– Extension tube	1450 g/m (15.6 oz/ft)
Sensor length (L)	0.3 … 6 m (0.984 … 19.69 ft)
Max. lateral load	140 Nm, max. 400 N (103 lbf ft, max. 90 lbf)

Output variable	
Output	Two-wire NAMUR output
Current consumption	
– Falling characteristics (max.)	≥ 2.4 mA uncovered/≤ 1 mA covered
– Rising characteristics (min.)	≤ 1 mA uncovered/≥ 2.4 mA covered
– Fault message	≤ 1 mA
Necessary processing system	NAMUR processing system according to IEC 60947-5-6 (EN 50227/DIN 19234)

Suitable signal conditioning instruments	VEGATOR 111, 112
Modes (NAMUR output adjustable to falling or rising characteristics)	
– Min.	rising characteristic curve (High current when immersed)
– Max.	falling characteristics (Low current when immersed)

Ambient conditions

Ambient temperature on the housing	-40 … +80 °C (-40 … +176 °F)
Storage and transport temperature	-40 … +80 °C (-40 … +176 °F)

Process conditions

Measured variable	Limit level of solids
Process pressure	-1 … 16 bar/-100 … 1600 kPa (-14.5 … 232 psig)

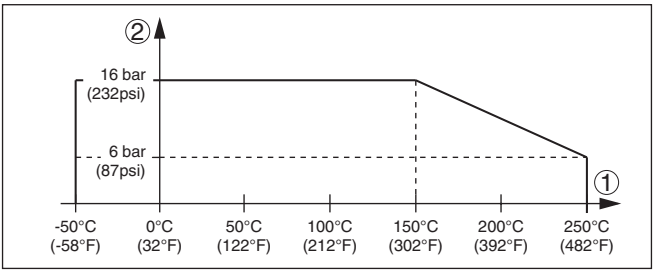

Fig. 30: Process pressure - Process temperature

1 Process temperature
2 Process pressure

VEGAVIB 63 of 316L	-50 … +150 °C (-58 … +302 °F)
Process temperature (thread or flange temperature) with temperature adapter (option)	-50 … +250 °C (-58 … +482 °F)

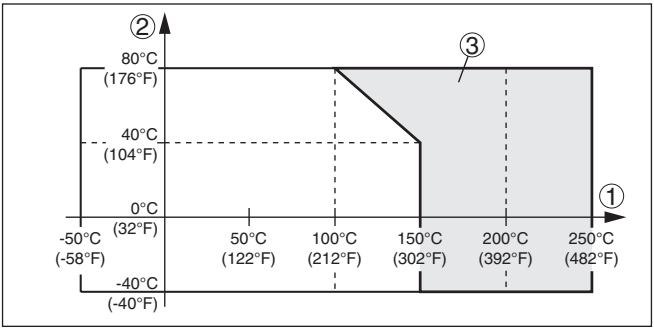

Fig. 31: Ambient temperature - Process temperature

1 Process temperature
2 Ambient temperature
3 Temperature range with temperature adapter

Density	
– Standard	> 0.05 g/cm³ (0.002 lbs/in³)
– adjustable	> 0.02 g/cm³ (0.0007 lbs/in³)
Granular size	no limitation[1]

Electromechanical data - version IP 66/IP 67 and IP 66/IP 68; 0.2 bar

Cable entry/plug[2]	
– Single chamber housing	– 1 x cable gland M20 x 1.5 (cable: ø 5 … 9 mm), 1 x blind plug M20 x 1.5 or: – 1 x closing cap ½ NPT, 1 x blind plug ½ NPT or: – 1 x plug (depending on the version), 1 x blind stopper M20 x 1.5
Spring-loaded terminals	for wire cross-section up to 1.5 mm² (AWG 16)

Electromechanical data - version IP 66/IP 68 (1 bar)

Cable entry	
– Single chamber housing	– 1 x IP 68 cable gland M20 x 1.5; 1 x blind plug M20 x 1.5 or: – 1 x closing cap ½ NPT, 1 x blind plug ½ NPT
Connection cable	
– Wire cross-section	> 0.5 mm² (AWG 20)
– Wire resistance	< 0.036 Ω/m (0.011 Ω/ft)
– Tensile strength	< 1200 N (270 lbf)
– Standard length	5 m (16.4 ft)
– Max. length	1000 m (3280 ft)
– Min. bending radius	25 mm (0.984 in) with 25 °C (77 °F)
– Diameter approx.	8 mm (0.315 in)
– Colour - standard PE	Black
– Colour - standard PUR	Blue
– Colour - Ex-version	Blue

Adjustment elements

Mode switch	
– Min.	rising characteristic curve (High current when immersed)
– Max.	falling characteristics (Low current when immersed)
Potentiometer for switching point adaptation	0.02 … 0.1 g/cm³ (0.0007 … 0.036 lbs/in³)
Simulation key	simulation of a line break between sensor and processing unit

[1] max. 20 mm (0.8 in) with product density < 0.05 g/cm³ (0.002 lbs/in³).

[2] Depending on the version M12 x 1, according to ISO 4400, Harting, 7/8" FF.

Voltage supply	
Operating voltage (characteristics according to standard)	for connection to an amplifier according to NAMUR IEC 60947-5-6, approx. 8.2 V
Off-load voltage	U_0 approx. 8.2 V
Shortcircuit current	I_U approx. 8.2 mA

Electrical protective measures	
Protection rating	
– Plastic housing	IP 66/IP 67 (NEMA 4X)
– Aluminium and stainless steel standard	IP 66/IP 68 (0.2 bar), NEMA 6P[3)]
– Aluminium and stainless housing (optionally available)	IP 66/IP 68 (1 bar) NEMA 6P
Overvoltage category	III
Protection class	II

Approvals

Instruments with approvals can have different technical specifications depending on the version.

For that reason the associated approval documents of these instruments have to be carefully noted. They are part of the delivery or can be downloaded under www.vega.com via "*VEGA Tools*" and "*Instrument search*" as well as via "*Downloads*" and "*Approvals*".

9.2 Dimensions

Housing in protection IP 66/IP 67 and IP 66/IP 68; 0.2 bar

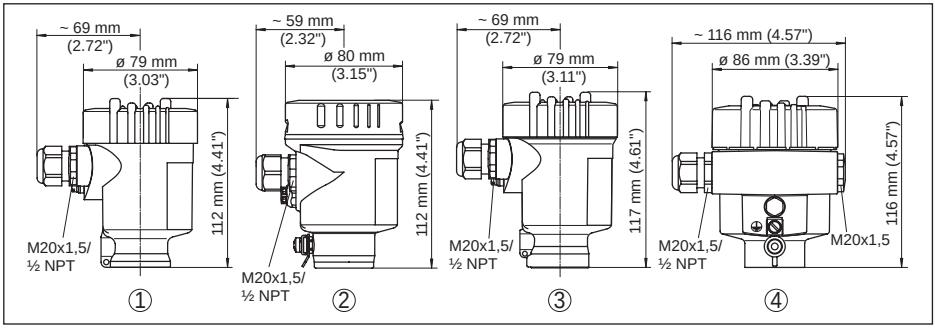

Fig. 32: Housing versions in protection IP 66/IP 67 and IP 66/IP 68; 0.2 bar

1 *Plastic housing*
2 *Stainless steel housing, electropolished*
3 *Stainless steel housing, precision casting*
4 *Aluminium housing*

3) A suitable cable is the prerequisite for maintaining the protection rating.

Housing in protection IP 66/IP 68 (1 bar)

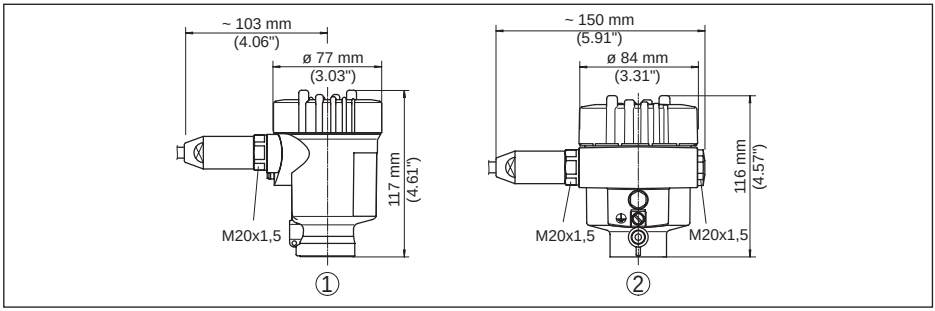

Fig. 33: Housing versions with protection rating IP 66/IP 68 (1 bar)

1 Stainless steel housing, precision casting
2 Aluminium housing

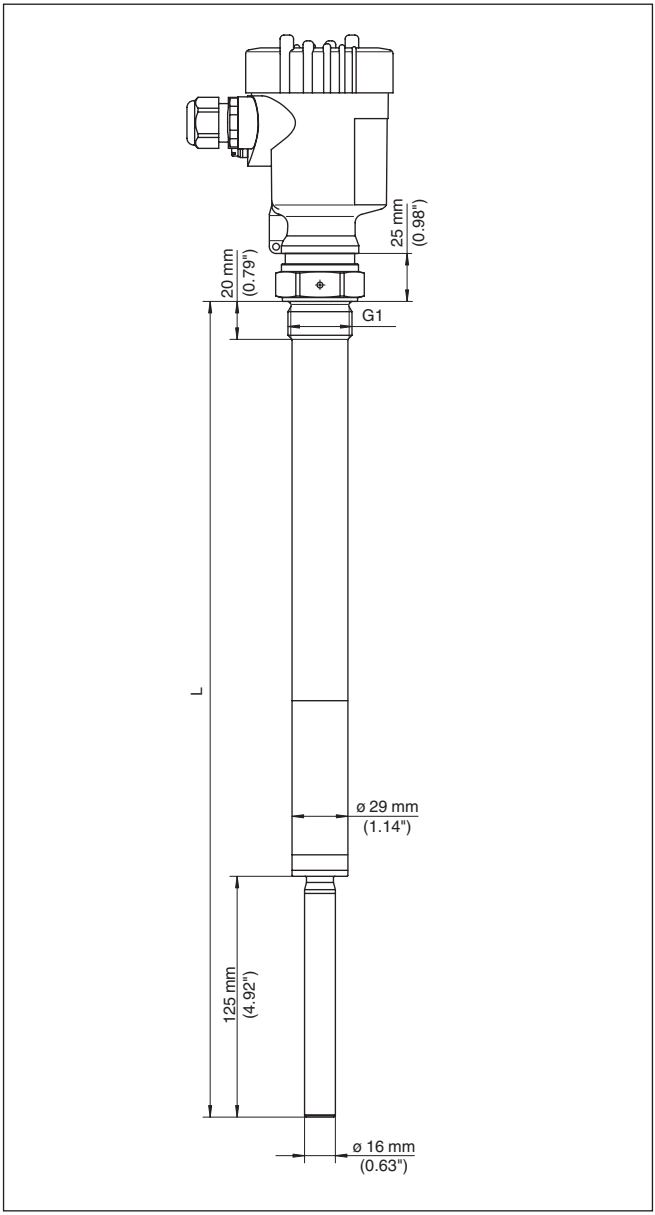

Fig. 34: VEGAVIB 63, threaded version G1 A (DIN ISO 228/1)

L Sensor length, see chapter "Technical data"

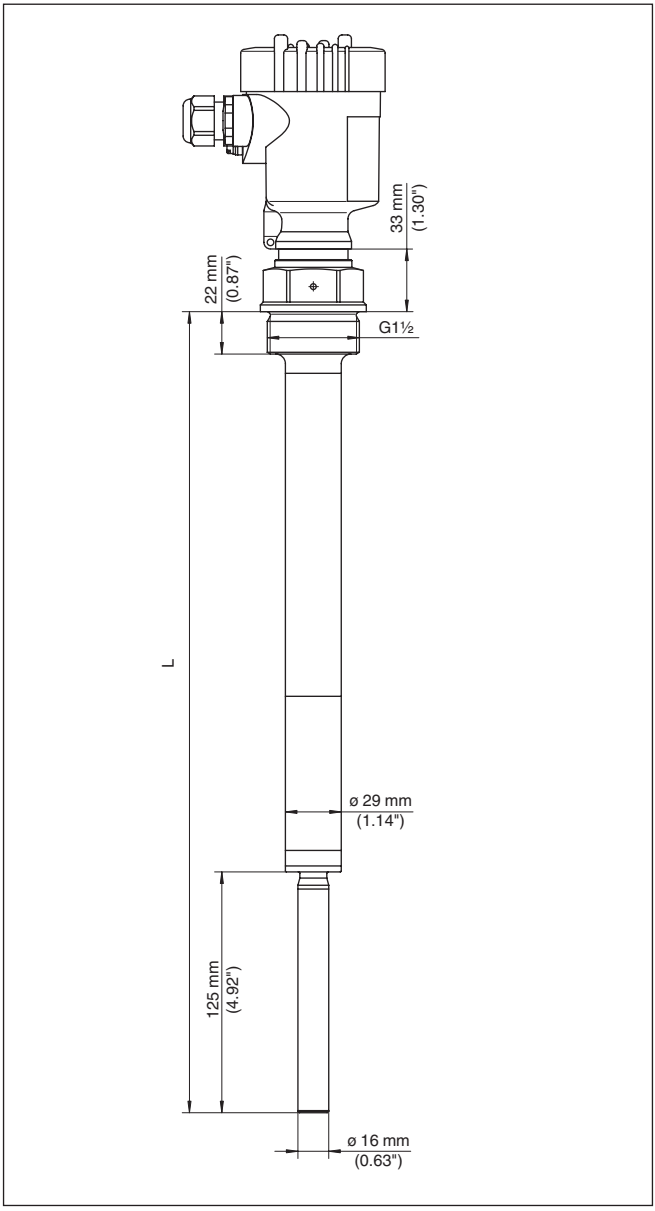

Fig. 35: VEGAVIB 63, threaded version G1½ A (DIN ISO 228/1)

L Sensor length, see chapter "Technical data"

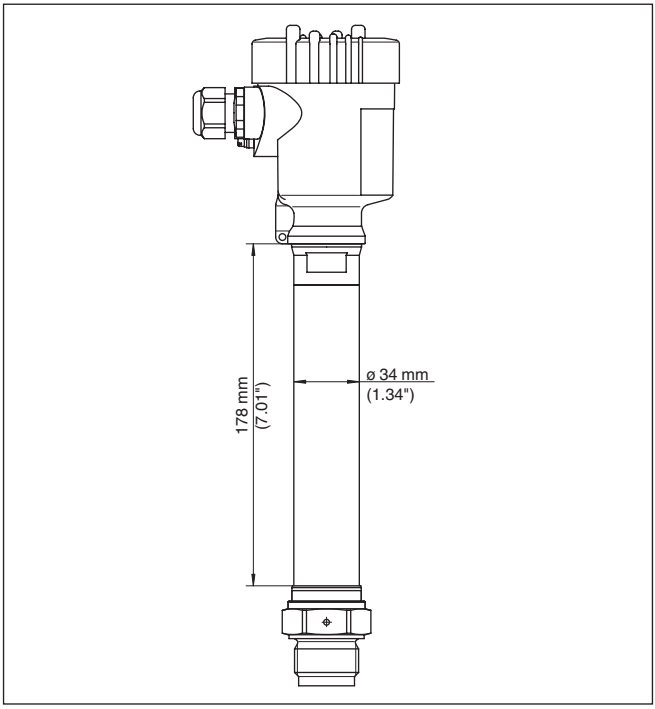

Fig. 36: Temperature adapter

9.3 Industrial property rights

VEGA product lines are global protected by industrial property rights. Further information see www.vega.com.

Only in U.S.A.: Further information see patent label at the sensor housing.

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Nähere Informationen unter www.vega.com.

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9.4 Trademark

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Printing date:

All statements concerning scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the information available at the time of printing.
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31217-EN-140625

VEGA Grieshaber KG
Am Hohenstein 113
77761 Schiltach
Germany

Phone +49 7836 50-0
Fax +49 7836 50-201
E-mail: info.de@vega.com
www.vega.com